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AN  
INAUGURAL DISSERTATION

ON

CATARACT:

S U B M I T T E D

T O T H E

E X A M I N A T I O N

O F T H E

*REV. JOHN EWING, S. T. P. PROVOST,*

T H E

*TRUSTEES & MEDICAL FACULTY,*

O F T H E

UNIVERSITY OF PENNSYLVANIA,

On the thirty-first of May 1800,

F O R T H E D E C R E E O F

D O C T O R O F M E D I C I N E :

—♦♦— 21384

By FREDERIC SEIP, of PHILADELPHIA.

—♦♦—

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TO

PHILIP SYNG PHYSIC, M. D.

ONE OF THE PHYSICIANS AND SURGEONS TO THE  
PENNSYLVANIA HOSPITAL;

THIS

DISSERTATION

IS RESPECTFULLY INSCRIBED,

AS A SMALL BUT SINCERE TRIBUTE

OF

*GRATITUDE AND ESTEEM,*

FOR THE MANY

VALUABLE OPPORTUNITIES OF INSTRUCTION,

RECEIVED

DURING THE STUDIES OF

HIS AFFECTIONATE FRIEND AND PUPIL,

FREDERIC SEIP.



TO

THOMAS PARKE, M. D.

ONE OF THE PHYSICIANS TO THE PENNSYLVANIA  
HOSPITAL;

AS A TESTIMONY

OF

*RESPECT AND ESTEEM*

FROM

HIS OBLIGED FRIEND

AND FORMER PUPIL,

FREDERIC SEIP.



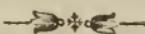
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A

DISSERTATION

ON

C A T A R A C T.



**C**ATARACT, the subject of the following pages, appears to have been known to Hippocrates, and the ancient Greeks, by the term glaukosis. They however had a very erroneous opinion concerning the seat of it; it was supposed by them to be a membrane adhering to the edge of the pupil, formed by the thickening of the aqueous humor, and thus stopping the rays of light.\*

Galen, perhaps, was the first who specified any difference in defining the cataract to be a film, situated behind the iris, and the glaucoma, a disorder of the chryalline humor. It was likewise supposed frequently to arise from an opacity of the vitreous humor.

Later discoveries have however proven, that this disorder is always seated in the chryalline lens, or the membrane immediately investing it.

Blindness, from this cause, therefore, arises from the interception of the rays of light, in their passage to the retina.

\* St. Yves.

The cause of this opacity has never been satisfactorily accounted for ; inflammation however appears to be occasionally the cause of it. It may be produced by diseases of the system, exclusive of any injury done to the eye itself, as gout, scrophula, and the venereal disease, of which instances are related.\* Also, from falls, blows, external violence, &c. done to the eye itself. Many cases are to be found, in which it has been attributed to strong light.

This opacity sometimes comes on suddenly, of which many cases are recorded ; Mr. Pott mentions four instances of it, and is of opinion that where it does occur instantaneously after a blow, the capsule alone is opaque ; his words are, “ Whether this be not an affection of the capsula merely, I much doubt, or rather am much inclined to suspect that it most frequently is. In three of the four, which have fallen under my observation, the opacity has gradually disappeared, after the inflammation, in consequence of the blow, had gone off, and the eyes were left as clear as ever ; a consequence which I think may be accounted for by supposing the opacity in the capsula only, but cannot if we suppose it to be the corpus crystallinum itself.” But such occurrences are rare, and it more frequently happens, that the disease approaches in a very gradual manner, and proceeds from a slight degree of dimness to an entire loss of vision.

The symptoms, which usually precede an opacity of the lens, are, a weakness of sight, the appearance of dust, or motes, flying before the eyes, also a settled mist surrounding all objects. The patient generally being able to see better in a moderate than a strong light.

The lens, in the forming state of the disease, is but little altered, but by degrees these symptoms become more and more alarming, vision is greatly impeded, colours are hardly to be distinguished; until at length, the patient is scarcely able to distinguish light from darkness. This however is not always the case, patients can very frequently distinguish a light colour from a dark one. These symptoms are most frequently unaccompanied with pain unless some degree of inflammation attends.

The opacity of the lens proceeds in proportion to the degree of blindness that attends, sometimes occupying the whole pupil of the eye, and sometimes appearing like a speck or spot in the pupil.

The colour of the lens appears most commonly of a light grey, though this often varies; it is sometimes entirely white; some cases are recorded, where the lens has been of a black colour, of this Mr. Ware mentions some instances in his translation of Baron Wenzel.\*

From this diversity of colour in the lens, surgeons have endeavoured to determine the state of the lens with regard to its consistence. The cream coloured

## B

\* Also by Pellier. Bell's IV. Vol.

cataract, it was supposed, most frequently occurs, where the cataract is fluid. The yellow coloured, Mr. Sharp thought, always adhered to the iris, and was incurable. The firm cataract, it has been supposed, was almost in every instance of a brown colour.

The lens also differs in consistence in different cases, sometimes existing in a fluid form, often of a cheesy consistence, and sometimes so hard as to be compared to bone.\* This difference in the consistence of the lens has also given rise to terms, so much relied upon by old authors, viz. the milky, purulent and cheesy, and as they supposed were only different degrees of alteration which the lens must undergo, before it arrived to a full ripeness. These characteristic marks of a soft or hard cataract, are now known to be very uncertain and not to be depended upon.

To determine whether an opacity of the crystalline lens, is the cause of blindness or not, we are directed to place the patient in a situation, in which the light may fall obliquely upon the eye; if an opacity is observed immediately behind the iris, and the pupil, upon closing the eye for a short space of time, is found to contract as soon as exposed to the light again, we may readily infer, that it is a cataract; but this does not determine whether the opacity be seated in the lens, or its capsule. It has been said, that this may be determined by the ope-

\* St. Yves and Heister.

city appearing at the back part of the lens, and at a greater distance from the iris, when the lens alone is opake, and by its appearing more anterior, and occupying the whole pupil, where the capsule of the lens is the seat of it. But I believe this is not so readily done as some writers may imagine.

A disease with which an opacity of the lens is sometimes accompanied, is gutta serena ; this is known from the pupil of the eye not contracting, when exposed suddenly to light, and from the patient not being able to distinguish the least degree of light ; in such instances, it will be proper to predict the probable event of an operation, and to avoid performing it, unless insisted upon by the patient. This, however, may occur in one eye only, and the other may succeed ; of this I knew an instance.

From a gutta serena, an opacity of the lens is distinguished by the colour of the pupil, which is mostly white in the cataract, and always black in the gutta serena, the pupil also remaining dilated in every degree of light. But a case in which it would be more difficult to distinguish occurs, where the cataract appears of a dark colour ; this dark colour is said to differ from the clear black, which the pupil assumes in a state of health, and appears turbid behind the pupil. It may be distinguished from the gutta serena, by the contraction of the pupil, when exposed to light, and according to Rowley, the image of the person looking into the pupil, can be

perceived in the gutta serena, but not in the black cataract.

An opacity of the lens may be distinguished from opaque spots upon the cornea, by a side view of the eye; in which case, the spots upon the cornea will be found anterior to the iris.

The hypopion, or collection of matter in the anterior chamber of the eye, may be known, from the appearance of a white moveable liquid, floating in the chambers of it; the iris being partly or totally imperceptible, and according to Mr. Bell, from the protrusion of the cornea, giving it the appearance of a tumor.

The staphyloma is a preternatural dilation and elevation of the cornea, and sometimes of the sclerotica, occasioned by the protrusion of the aqueous humour through the lamella of the cornea;\* it is also applied to the iris, where it projects out of the aperture in the cornea, whether produced by a wound or other external or internal cause. There are several different names given, according to the different figure and magnitude of the tumor. The term staphyloma, was given to it because it was supposed to resemble a grape. Mr. Ware is of opinion, that it arises from the inner lamina of the cornea, uniting and protruding through one of the external laminæ, forming a kind of cyst.

\* St. Yves.

## METHODS OF CURE.

THE cure of the cataract may be attempted in three ways :—

First, by medicine and a proper regimen.

Secondly, by the operation called couching or depression ; and

Thirdly, by extraction.

Where inflammation appears to be the cause of a cataract, it will be very proper to endeavour by a low diet, also by blood-letting, both general and topical, to prevent its further progress.

To prevent the progress of this disease, no medicine appears to have been more advantage than mercury exhibited in small doses : but to be effectual, it should be persisted in for some length of time. “ I have seen,” says Rowley, “ many instances, in which the penetrating alteratives, with cinnabarine fumigations, have produced no sensible good effects for six or eight months, particularly in the colder seasons ; and yet, after these periods, the cure of the incipient cataract, and even the gutta serena, has advanced rapidly.” Some cases are to be found in which hemlock has been of service. Sauvage extols the white henbane as a specific in this case. But notwithstanding in some instances mercury has done service, it is a fact to be regretted, that it fails in most cases, and the only chance left for the patient, is by an operation, the object of which is to remove the opaque lens or capsule

from its situation, and thus permit the rays of light to pass down upon the retina.

Two methods of performing this operation have been recommended, viz. depression or couching, and extraction, each of which have had their advocates.

The operation by depression is of great antiquity, being known to Galen.

Extraction is of a much later discovery ; the invention is attributed to Freytagius, but was not made public until the year 1745, by Daviel, a celebrated French surgeon of Paris. The extraction of the lens, when it had passed through the pupil into the anterior chamber of the eye, in couching, was practised sixty years before by St. Yves, a French surgeon.

These methods of operating have severally been performed ever since their discovery, and it has not been decided which of the two is most proper.

The objections made against extraction, have been perhaps as numerous as those urged against depression ; but those urged against the latter operation appear to me to have by far the greatest weight : because extraction is adapted to cases wherein that of depression is not : it being also of great consequence for a practitioner to adopt the method best suited to obviate every case which occurs, I think the method by extraction will be found to possess advantages over that of depression.

It is certainly no uncommon thing to find surgeons still persisting in the method they have first adopted, urging it as a reason, that they can best perform it in such a manner ; this is seen every day, and in no science more particularly than that of surgery. This remark applies with particular force to the subject now under consideration ; for every one will admit, that practice in operating will familiarise the operator greatly, and it is with great reluctance that he changes his mode of doing it. This, therefore, ought to induce us to consider well the weight as well as the number of objections, made against any particular operation.

Extraction, I have said, is adapted to cases in which depression is not. This must be granted. First, where the capsule, as well as the crystalline lens, is opake ; this opacity of the capsule, we know, occurs very frequently, and if the remark made by Mr. Pott be well founded, it is an accident that is likely to follow every case. In a note to page 193,\* he says, “ The capsula is capable of becoming white and opake, while its contents shall be clear and transparent ; it becomes so sometimes by being wounded by the couching needle, used either for the depression of a firm cataract, or for the letting out of a soft one, and it will not unfrequently be found so after the operation of extraction, when no instrument has touched it.” Now

this opacity of the capsule does frequently exist, and where it does not, it is likely to happen from the operation : this, therefore, cannot be remedied by depression. Mr. Bell admits,\* that this cause “seems *a priori* to be the most conclusive against the operation for depression,” but adds, “that it will not on examination be found to be so ; because it is so rare an occurrence.” I believe this is not the case, and that it is a very frequent occurrence. It has been supposed by Mr. Bell, that this opacity of the capsule could not be cured even by extraction ; “for though (says he) the opaque capsule may indeed be forcibly torn away, by instruments passed through the pupil, but not without such violence being done to the eye as must be productive of certain blindness.” In this he is mistaken ; the capsule may be extracted, and that too without being productive of blindness, as Mr. Bell asserts. It was done in a case which occurred to Dr. Physic last spring ; the patient recovered his sight, and is now able to read a small print.

But the opacity may be seated in the capsule alone, and the lens remain clear and transparent. An instance of this I had an opportunity of seeing, in a case which occurred to Dr. Physic ; the opacity was not uniform ; a very small part upon the upper margin of it appeared clear, which led him to expect that the capsule was opaque, and accordingly he extracted it immediately after the incision of the

\* Page 402, vol. III.

cornea was made, and without removing the lens; whereupon the pupil became clear and black, and objects visible. In such a case as this, had depression been performed, the very part which ought to have remained, would have been removed, and the opacity still have continued. It is very probable too, that this often occurs where depression is performed, and thus remains unnoticed.

Another great objection to the method of depression is, that when the cataract is soft, or in a fluid state, depression does not succeed. It is said here, that this fluid will always dissolve gradually in the aqueous fluid, and at length disappear. But, according to Mr. Pott, when the cataract is of the mixed kind, partly soft, and partly hard, the case is more unfortunate, the firmer parts eluding the attempts of the needle to depress them; here it will sometimes happen, as he admits, that the firmer parts of the lens will remain in its nidus, and still form a cataract, which may possibly require a future or re-application of the instrument. Here it must be admitted, that had extraction been performed, a second operation would have been unnecessary; and in cases where the lens is soft, or fluid, it might at once be removed, and thus be prevented from irritating the internal parts of the eye, as it probably must do; and is perhaps one great cause of the inflammation which sometimes succeeds it. In proof of the injury that is sustained from this cause, Mr.

Ware mentions a case in which the lens came forward into the anterior chamber; "during the time," says he, "that the opake crystalline floated in the anterior chamber, the eye was constantly in a state of irritation, in consequence of which the patient was repeatedly requested to allow the opake body to be extracted, but he always objected to submit to it. The pupil remained large and clear after the cataract had disappeared, but the irritation, which its pressure on the iris kept up, continued so long, that it produced a true gutta serena, which totally destroyed vision. Some months after this, a cataract was completely formed in the opposite eye, which being extracted in the usual manner, the sight was thereby restored." But cases are recorded even by those who are in the habit of couching, where the lens in this state, remained for months and even years. Mr. Lucas mentions one in which the fluid cataract was not dispersed, in less than a year after the operation, upon whom it had been repeated three times: and a case is related by Mr. Sharpe,\* of a woman, whose cataract, after couching, became quite loose in the eye, and in an erect posture, sunk to the bottom of the eye, but by stooping forward, she could bring it quite over the pupil and remained so ever after.

A third objection urged against depression, is the frequent rising of the lens, after it has been depre-

\* Sharpe's Surgery.

fed. This is one of the most frequent occurrences attending this operation. This circumstance has been ascribed "to the fault of the surgeon or some other cause;" I believe it happens to the best operators, as we find from their accounts. The pain attending the repetition here, is urged as inconsiderable, but if the operation occasions any pain, I believe a second attempt will cause as much as the first, not to mention the danger from the fatigue which the eye undergoes at the time. In such a case extraction therefore would have rendered a repetition unnecessary.

The objections made against the operation by extraction are, the loss of the vitreous humour; the cicatrix formed upon the cornea, and the injury liable to be done to the iris.

The first objection, viz. the loss of the vitreous humour, appears to me to be the only one of any weight; but where it does occur in extraction, it arises either from an undue pressure made upon the eye, where the capsule of the lens has not been properly punctured, or where the incision of the cornea has been made too small. But the most probable cause of its occurrence seems to be, a diseased state of the vitreous humour; where such is the case, the derangement of it would be most apt to happen in couching, as the capsule of the lens is torn nearer to the vitreous humour and out of the view of the operator; and in addition to this, the lens in couching is forcibly pressed under the vitre-

ous humour, and in such a state of the eye may more easily produce a discharge of it. This discharge however is a rare occurrence, and may be particularly guarded against by a careful operator, as pressure may be made so light, as not to affect the vitreous humour, where the puncturing of the capsule has been sufficiently done. The loss moreover of a portion of it, is not attended with the loss of sight; it is even asserted by one of the most candid writers\* upon this subject, that those patients who only loose a small or moderate share of the vitreous humour, generally acquire a much sharper sight than those who have lost none of it.

The cicatrix formed after the incision of the cornea is one of the most trifling objections that can be made to this operation; for in most cases where the operation in other respects succeeds, the cicatrix is scarcely if at all perceptible; if even it does remain some length of time and then disappear, as it sometimes does, it does not obstruct the passage of the rays of light, except in a direction from below, where the incision is made upon the inferior part of it, which is not of so great importance, and certainly is not so disagreeable an occurrence, as an opaque portion of the cataract, or its capsule is, when left behind, and which is so lightly spoken of by the advocates for depression. In a great majority of cases, however, this cicatrix disappears altogether.

The injury that the iris sustains by the passage of the lens through the pupil, has been urged as an objection to extraction. An immobility of the iris may, in some instances, succeed the sudden extraction of the lens, where it has been large, and the pupil too much contracted.\* The pressure here in most cases has been too great, and done without sufficient caution. To prevent this therefore the eye may be closed for a short space of time, and the light diminished, until the lens has been extracted. As to the pain, which attends the operation, I believe it is certainly less than that caused by couching ; in the one, the cornea, which in a sound state is insensible, gives little or no pain, whilst in the other, the conjunctiva, which is highly sensible, and all the other coats of the eye are punctured ; add to this, the pressure of a foreign body upon so delicate a membrane as that of the retina, and it must certainly be admitted that the latter is most painful.

\* Dr. Reimarus, correspondent of the Hamburg Society, having remarked, that a few drops of belladonna dissolved in water and applied to the eyes, cause the pupil to dilate in so extraordinary a manner, that the iris is nearly reduced to nothing, was led from this circumstance to suggest the propriety of having recourse to this expedient, preparatory to the operation of couching the eye for a cataract. Of this intimation Dr. Gräsmeyer, who practises this operation with great skill at Hamburg, has made a very successful experiment. The effect produced by the solution on the eye, continues about half an hour, affording by the dilation of the pupil, an excellent opportunity of performing the operation, without danger of hurting the iris ; and the palsy, if it may be so termed, which invades the retina, prevents the baneful consequences which otherwise might accrue from too sudden accession of light.

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### METHOD OF EXTRACTION.

BEFORE the operation for extracting the cataract is determined upon, it is necessary to notice the circumstances that are previously necessary to be taken into consideration. That this operation may be likely to succeed, the patient should be in other respects healthy, the eye of its natural size, and the cornea transparent ; it is also desirable, that the pupil preserve its regular form, capable of contracting and dilating, and that light be discernible. Some think the season of the year also of consequence, spring and autumn being generally preferred.

To guard as much as possible against inflammation, after the operation, it is necessary that the patient be kept upon a low diet several days before the operation, and the use of laxative medicines prescribed. Where plethora indicates it, blood-letting will be necessary.

These circumstances being properly attended to, and all things prepared, the operation may be proceeded upon. The next circumstance necessary to be considered is, in what manner the eye is to be secured during the operation. For this purpose different instruments have been invented : the one generally made use of is the speculum. This instrument does not however answer the intention of the operator, as it irritates the eye very much ; even when applied upon a sound eye, the irritation con-

tinues for half an hour. The pressure of it also often does mischief, and incommodes the operator greatly; it is of great consequence too, that one hand of the operator be at liberty to hold down the under eye-lid, whilst the incision of the cornea is going on. The best reason however for not using it is, that the eye can be held sufficiently secure by the fingers of the operator and assistant, without the aid of such an instrument.

The instruments necessary for the operation are, a knife, a small pair of forceps, a small scoop, a small hook, and a needle. The best form for the knife is that described and made use of by Baron Wenzel.

The patient is to be seated upon a chair, somewhat lower than that which the operator makes use of, and placed in such a manner that the light may fall obliquely across the eye to be operated upon; for if the rays of light fall directly upon it, the reflection from the cornea will embarrass the operator.

The assistant is to stand behind the patient, and support his head against his breast, and with the fore and middle fingers of one hand he is to raise the upper lid, pressing it against the orbit of the eye.

The operator is to pull down the under eye-lid, with the fore and middle fingers of the one hand, and at the same time, making pressure enough against the ball of the eye, to secure it properly.

The incision of the cornea, which constitutes the principal part of this operation, should be done with one cut; for this purpose, the broadest part of the knife is now directed to be as broad as one half of the cornea. The blade of the knife being constructed in such a manner that it gradually increases in breadth, from the point to the heel, in order that it may fill up the incision, as it passes through, and thus prevent the discharge of the aqueous humour. The eye being in a favourable position, the point of the knife is to be made to penetrate the cornea suddenly, which generally secures it from moving, at a very small distance from the junction of the cornea, and at the outer extremity of a line, which would run directly through the centre of the pupil. The direction of the knife should be made at first a little obliquely inwards, so as to avoid making the incision too small, as it would be if the knife should penetrate the cornea obliquely outwards. As soon as the point of the knife has fairly entered the anterior chamber of the eye, its direction should be altered, and directed in a straight line to the opposite point of the cornea, this should be done carefully, to avoid the iris. When it does approach the knife, we are directed to press very gently upon the cornea, with the fore finger of one hand, which will cause it to recede.

The knife carried in this manner, will have nearly cut through the inferior portion of the cornea, by the time it has got some distance through the

opposite point of it, when the assistant is to remove all pressure from the eye, and the incision is to be finished.

As soon as the incision has been completed, the next step is to open the capsule of the lens : for this purpose various means are recommended ; some expert operators perform it at the same time that the incision of the cornea is doing, and with the same instrument, this though it may be done, is not advisable ; a small sharp needle is sometimes used for this purpose, and a small puncture is thought sufficient ; but the most experienced operators advise the puncture to be repeated, so that the capsule may be torn, and thus allow an easy passage for the lens, (an instrument used by Mr. Pellier called a cystatome,\* appears very well calculated for this purpose). This advice appears very rational, as less pressure is requisite to detach the lens, and allow every portion of it, to be more easily extracted by means of the scoop. Richter, who advises this method strongly, is of opinion, that it prevents the opaque spots, which sometimes occur after the operation, and are taken for an opacity of the capsule ; which he says he never saw, and attributes to this method of opening the membrane.

When the capsule has been freely punctured, gentle pressure should be used, until the lens is extracted, the eye then is to be left at rest for some

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\* Bell. Vol. IV.

time, in order to ascertain, whether any opake portions still remain, which, if seen, are to be extracted by means of the scoop.

The capsule, however, very frequently is opake, and in such cases ought always to be extracted ; for this purpose, I think extracting it before the lens is removed, is to be preferred, for in this way, the lens supports the capsule, and renders it very easy to be laid hold of by the forceps, and effectually prevents any accident from that source.

The operation by depression, is performed in the following manner : the patient being seated and the eye secured, as directed for extraction ; a flat needle is to be introduced, about one tenth of an inch from the cornea, through the scelerotica into the posterior chamber of the eye, until it is seen through the pupil ; in order to avoid injuring the iris, the flat side of the needle may be made to pass next to it, until it arrives at the lens, when the flat side is to be turned downwards, and in this direction, is pushed into the cataract, which is to be carried down before, and under the vitreous humour : should it, however, rise again, it must again and again be pushed down. If the cataract is fluid, all that can be done, is to lacerate the capsule properly, in order that its contents may mix freely with the aqueous humour.

After the operation is finished, the eye should be covered with a soft linnen rag suspended over it, from a circular bandage round the head, and the

patient confined to bed, on his back, in a dark room, and kept upon a low diet, for two or three weeks. Every thing which may irritate the eyes, or produce coughing, sneezing or vomiting, to be particularly guarded against.

Should inflammation or pain succeed, blood-letting, both general and topical, blisters, and such antiphlogistic means, as are generally employed, will be necessary, as an obstinate inflammation may endanger the success of the operation.

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